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SEQUENCE LISTING

(1) GENERAL INFORMATION:

(i) APPLICANT

(US only): ANTALIS Toni Marie and HOOPER John David
(Other than US): AMRAD OPERATIONS PTY LTD

(ii) TITLE OF INVENTION: NOVEL MOLECULES

(iii) NUMBER OF SEQUENCES: 30

(iv) CORRESPONDENCE ADDRESS:

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(B) STREET: 1 LITTLE COLLINS STREET
(C) CITY: MELBOURNE
(D) STATE: VICTORIA
(E) COUNTRY: AUSTRALIA
(F) ZIP: 3000

(v) COMPUTER READABLE FORM:

(A) MEDIUM TYPE: Floppy disk
(B) COMPUTER: IBM PC compatible
(C) OPERATING SYSTEM: PC-DOS/MS-DOS
(D) SOFTWARE: PatentIn Release #1.0, Version #1.25

(vi) CURRENT APPLICATION DATA:

(A) APPLICATION NUMBER: US Application
(B) FILING DATE: 13-FEB-1998
(C) CLASSIFICATION:

(vii) PRIOR APPLICATION DATA:

(A) APPLICATION NUMBER: PO5101/97
(B) FILING DATE: 13-FEB-1997
(C) CLASSIFICATION:

(vii) PRIOR APPLICATION DATA:

(A) APPLICATION NUMBER: PP0422/97
(B) FILING DATE: 18-NOV-1997
(C) CLASSIFICATION:

(vii) PRIOR APPLICATION DATA:

(A) APPLICATION NUMBER: International PCT Application
(B) FILING DATE: 13-FEB-1998
(C) CLASSIFICATION:

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(viii) ATTORNEY/AGENT INFORMATION:

- (A) NAME: DIGIGLIO, FRANK S
- (B) REGISTRATION NO: 31,346
- (C) REFERENCE/DOCKET NUMBER:

(ix) TELECOMMUNICATION INFORMATION:

- (A) TELEPHONE: (516) 742 4343
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- (C) TELEX: 230 901 SANS UR

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(2) INFORMATION FOR SEQ ID NO:1:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 32 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

ACAGAATTCT GGGTIGTIAC IGCIGCICAY TG

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(2) INFORMATION FOR SEQ ID NO:2:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 1094 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

ACAGAATTCA XIGGICCCIC IC/GT/AXTCICC

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(2) INFORMATION FOR SEQ ID NO:3:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 1094 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 17..965

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

CGCGGGAGAG GAGGCC ATG GCG GCG GCG GCG CTG CTG CTG GCG CTG	49
Met Gly Ala Arg Gly Ala Leu Leu Leu Ala Leu	
1 5 10	
CTG CTG GCT CGG GCT GGA CTC AGG AAG CCG GAG TCG CAG GAG GCG GCG	97
Leu Leu Ala Arg Ala Gly Leu Arg Lys Pro Glu Ser Gln Glu Ala Ala	
15 20 25	
CCG TTA TCA GGA CCA TGC GGC CGA CGG GTC ATC ACG TCG CGC ATC GTG	145
Pro Leu Ser Gly Pro Cys Gly Arg Arg Val Ile Thr Ser Arg Ile Val	
30 35 40	
GGT GGA GAG GAC GCC GAA CTC GGG CGT TGG CCG TGG CAG GGG AGC CTG	193
Gly Gly Glu Asp Ala Glu Leu Gly Arg Trp Pro Trp Gln Gly Ser Leu	
45 50 55	
CGC CTG TGG GAT TCC CAC GTA TGC GGA GTG AGC CTG CTC AGC CAC CGC	241
Arg Leu Trp Asp Ser His Val Cys Gly Val Ser Leu Leu Ser His Arg	
60 65 70 75	
TGG GCA CTC ACG GCG GCG CAC TGC TTT GAA ACT GAC CTT AGT GAT CCC	289
Trp Ala Leu Thr Ala Ala His Cys Phe Glu Thr Asp Leu Ser Asp Pro	
80 85 90	
TCC GGG TGG ATG GTC CAG TTT GGC CAG CTG ACT TCC ATG CCA TCC TTC	337
Ser Gly Trp Met Val Gln Phe Gly Gln Leu Thr Ser Met Pro Ser Phe	
95 100 105	
TGG AGC CTG CAG GCC TAC TAC ACC CGT TAC TTC GTA TCG AAT ATC TAT	385
Trp Ser Leu Gln Ala Tyr Tyr Thr Arg Tyr Phe Val Ser Asn Ile Tyr	
110 115 120	
CTG AGC CCT CGC TAC CTG GGG AAT TCA CCC TAT GAC ATT GCC TTG GTG	433
Leu Ser Pro Arg Tyr Leu Gly Asn Ser Pro Tyr Asp Ile Ala Leu Val	
125 130 135	
AAG CTG TCT GCA CCT GTC ACC TAC ACT AAA CAC ATC CAG CCC ATC TGT	481
Lys Leu Ser Ala Pro Val Thr Tyr Thr Lys His Ile Gln Pro Ile Cys	
140 145 150 155	
CTC CAG GCC TCC ACA TTT GAG TTT GAG AAC CGG ACA GAC TGC TGG GTG	529
Leu Gln Ala Ser Thr Phe Glu Phe Glu Asn Arg Thr Asp Cys Trp Val	
160 165 170	

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ACT GGC TGG GGG TAC ATC AAA GAG GAT GAG GCA CTG CCA TCT CCC CAC	577
Thr Gly Trp Gly Tyr Ile Lys Glu Asp Glu Ala Leu Pro Ser Pro His	
175 180 185	
ACC CTC CAG GAA GTT CAG GTC GCC ATC ATA AAC AAC TCT ATG TGC AAC	625
Thr Leu Gln Glu Val Gln Val Ala Ile Ile Asn Asn Ser Met Cys Asn	
190 195 200	
CAC CTC TTC CTC AAG TAC AGT TTC CGC AAG GAC ATC TTT GGA GAC ATG	673
His Leu Phe Leu Lys Tyr Ser Phe Arg Lys Asp Ile Phe Gly Asp Met	
205 210 215	
GTT TGT GCT GGC AAT GCC CAA GGC GGG AAG GAT GCC TGC TTC GGT GAC	721
Val Cys Ala Gly Asn Ala Gln Gly Gly Lys Asp Ala Cys Phe Gly Asp	
220 225 230 235	
TCA GGT GGA CCC TTG GCC TGT AAC AAG GAT GGA CTG TGG TAT CAG ATT	769
Ser Gly Gly Pro Leu Ala Cys Asn Lys Asp Gly Leu Trp Tyr Gln Ile	
240 245 250	
GGA GTC GTG AGC TGG GGA GTG GGC TGT GGT CGG CCC AAT CGG CCC GGT	817
Gly Val Val Ser Trp Gly Val Gly Cys Gly Arg Pro Asn Arg Pro Gly	
255 260 265	
GTC TAC ACC AAT ATC AGC CAC CAC TTT GAG TGG ATC CAG AAG CTG ATG	865
Val Tyr Thr Asn Ile Ser His His Phe Glu Trp Ile Gln Lys Leu Met	
270 275 280	
GCC CAG AGT GGC ATG TCC CAG CCA GAC CCC TCC TGG CCG CTA CTC TTT	913
Ala Gln Ser Gly Met Ser Gln Pro Asp Pro Ser Trp Pro Leu Leu Phe	
285 290 295	
TTC CCT CTT CTC TGG GCT CTC CCA CTC CTG GGG CCG GTC TGA	961
Phe Pro Leu Leu Trp Ala Leu Pro Leu Leu Gly Pro Val *	
300 305 310	
GCCTACCTGA GCCCATGCAG CCTGGGGCCA CTGCCAAGTC AGGCCCTGGT TCTCTTCTGT	1015
CTTGTTTGGT AATAAACACA TTCCAGTTGA TGCCTTGCAG GGCATTTTTC AAAAAAAAAA	1075
AAAAAAAAA AAAAAAAAAA	1094

(2) INFORMATION FOR SEQ ID NO:4:

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(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 313 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

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Met Gly Ala Arg Gly Ala Leu Leu Leu Ala Leu Leu Leu Ala Arg Ala
 1             5             10             15

Gly Leu Arg Lys Pro Glu Ser Gln Glu Ala Ala Pro Leu Ser Gly Pro
 20             25             30

Cys Gly Arg Arg Val Ile Thr Ser Arg Ile Val Gly Gly Glu Asp Ala
 35             40             45

Glu Leu Gly Arg Trp Pro Trp Gln Gly Ser Leu Arg Leu Trp Asp Ser
 50             55             60

His Val Cys Gly Val Ser Leu Leu Ser His Arg Trp Ala Leu Thr Ala
 65             70             75             80

Ala His Cys Phe Glu Thr Asp Leu Ser Asp Pro Ser Gly Trp Met Val
 85             90             95

Gln Phe Gly Gln Leu Thr Ser Met Pro Ser Phe Trp Ser Leu Gln Ala
100             105             110

Tyr Tyr Thr Arg Tyr Phe Val Ser Asn Ile Tyr Leu Ser Pro Arg Tyr
115             120             125

Leu Gly Asn Ser Pro Tyr Asp Ile Ala Leu Val Lys Leu Ser Ala Pro
130             135             140

Val Thr Tyr Thr Lys His Ile Gln Pro Ile Cys Leu Gln Ala Ser Thr
145             150             155             160

Phe Glu Phe Glu Asn Arg Thr Asp Cys Trp Val Thr Gly Trp Gly Tyr
165             170             175

Ile Lys Glu Asp Glu Ala Leu Pro Ser Pro His Thr Leu Gln Glu Val
180             185             190

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Gln Val Ala Ile Ile Asn Asn Ser Met Cys Asn His Leu Phe Leu Lys
195 200 205

Tyr Ser Phe Arg Lys Asp Ile Phe Gly Asp Met Val Cys Ala Gly Asn
210 215 220

Ala Gln Gly Gly Lys Asp Ala Cys Phe Gly Asp Ser Gly Gly Pro Leu
225 230 235 240

Ala Cys Asn Lys Asp Gly Leu Trp Tyr Gln Ile Gly Val Val Ser Trp
245 250 255

Gly Val Gly Cys Gly Arg Pro Asn Arg Pro Gly Val Tyr Thr Asn Ile
260 265 270

Ser His His Phe Glu Trp Ile Gln Lys Leu Met Ala Gln Ser Gly Met
275 280 285

Ser Gln Pro Asp Pro Ser Trp Pro Leu Leu Phe Phe Pro Leu Leu Trp
290 295 300

Ala Leu Pro Leu Leu Gly Pro Val *
305 310

(2) INFORMATION FOR SEQ ID NO:5:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 1100 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 17..961

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

CGCGGGAGAG GAGGCC ATG GGC GCG CGC GGG GCG CTG CTG CTG GCG CTG
Met Gly Ala Arg Gly Ala Leu Leu Leu Ala Leu

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1	5	10	
CTG CTG GCT CGG GCT GGA CTC AGG AAG CCG GAG TCG CAG GAG GCG GCG			97
Leu Leu Ala Arg Ala Gly Leu Arg Lys Pro Glu Ser Gln Glu Ala Ala			
15	20	25	
CCG TTA TCA GGA CCA TGC GGC CGA CGG GTC ATC ACG TCG CGC ATC GTG			145
Pro Leu Ser Gly Pro Cys Gly Arg Arg Val Ile Thr Ser Arg Ile Val			
30	35	40	
GGT GGA GAG GAC GCC GAA CTC GGG CGT TGG CCG TGG CAG GGG AGC CTG			193
Gly Gly Glu Asp Ala Glu Leu Gly Arg Trp Pro Trp Gln Gly Ser Leu			
45	50	55	
CGC CTG TGG GAT TCC CAC GTA TGC GGA GTG AGC CTG CTC AGC CAC CGC			241
Arg Leu Trp Asp Ser His Val Cys Gly Val Ser Leu Leu Ser His Arg			
60	65	70	75
TGG GCA CTC ACG GCG GCG CAC TGC TTT GAA ACC TAT AGT GAC CTT AGT			289
Trp Ala Leu Thr Ala Ala His Cys Phe Glu Thr Tyr Ser Asp Leu Ser			
80	85	90	
GAT CCC TCC GGG TGG ATG GTC CAG TTT GGC CAG CTG ACT TCC ATG CCA			337
Asp Pro Ser Gly Trp Met Val Gln Phe Gly Gln Leu Thr Ser Met Pro			
95	100	105	
TCC TTC TGG AGC CTG CAG GCC TAC TAC ACC CGT TAC TTC GTA TCG AAT			385
Ser Phe Trp Ser Leu Gln Ala Tyr Tyr Thr Arg Tyr Phe Val Ser Asn			
110	115	120	
ATC TAT CTG AGC CCT CGC TAC CTG GGG AAT TCA CCC TAT GAC ATT GCC			433
Ile Tyr Leu Ser Pro Arg Tyr Leu Gly Asn Ser Pro Tyr Asp Ile Ala			
125	130	135	
TTG GTG AAG CTG TCT GCA CCT GTC ACC TAC ACT AAA CAC ATC CAG CCC			481
Leu Val Lys Leu Ser Ala Pro Val Thr Tyr Thr Lys His Ile Gln Pro			
140	145	150	155
ATC TGT CTC CAG GCC TCC ACA TTT GAG TTT GAG AAC CGG ACA GAC TGC			529
Ile Cys Leu Gln Ala Ser Thr Phe Glu Phe Glu Asn Arg Thr Asp Cys			
160	165	170	
TGG GTG ACT GGC TGG GGG TAC ATC AAA GAG GAT GAG GCA CTG CCA TCT			577
Trp Val Thr Gly Trp Gly Tyr Ile Lys Glu Asp Glu Ala Leu Pro Ser			
175	180	185	

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CCC CAC ACC CTC CAG GAA GTT CAG GTC GCC ATC ATA AAC AAC TCT ATG	625
Pro His Thr Leu Gln Glu Val Gln Val Ala Ile Ile Asn Asn Ser Met	
190 195 200	
TGC AAC CAC CTC TTC CTC AAG TAC AGT TTC CGC AAG GAC ATC TTT GGA	673
Cys Asn His Leu Phe Leu Lys Tyr Ser Phe Arg Lys Asp Ile Phe Gly	
205 210 215	
GAC ATG GTT TGT GCT GGC AAT GCC CAA GGC GGG AAG GAT GCC TGC TTC	721
Asp Met Val Cys Ala Gly Asn Ala Gln Gly Gly Lys Asp Ala Cys Phe	
220 225 230 235	
GGT GAC TCA GGT GGA CCC TTG GCC TGT AAC AAG GAT GGA CTG TGG TAT	769
Gly Asp Ser Gly Gly Pro Leu Ala Cys Asn Lys Asp Gly Leu Trp Tyr	
240 245 250	
CAG ATT GGA GTC GTG AGC TGG GGA GTG GGC TGT GGT CGG CCC AAT CGG	817
Gln Ile Gly Val Val Ser Trp Gly Val Gly Cys Gly Arg Pro Asn Arg	
255 260 265	
CCC GGT GTC TAC ACC AAT ATC AGC CAC CAC TTT GAG TGG ATC CAG AAG	865
Pro Gly Val Tyr Thr Asn Ile Ser His His Phe Glu Trp Ile Gln Lys	
270 275 280	
CTG ATG GCC CAG AGT GGC ATG TCC CAG CCA GAC CCC TCC TGG CCG CTA	913
Leu Met Ala Gln Ser Gly Met Ser Gln Pro Asp Pro Ser Trp Pro Leu	
285 290 295	
CTC TTT TTC CCT CTT CTC TGG GCT CTC CCA CTC CTG GGG CCG GTC TGAGCCTACC	
968	
Leu Phe Phe Pro Leu Leu Trp Ala Leu Pro Leu Leu Gly Pro Val	
300 305 310 315	
TGAGCCCATG CAGCCTGGGG CCACTGCCAA GTCAGGCCCT GGTCTCTTC TGTCTTGTTT	1028
GGTAATAAAC ACATTCCAGT TGATGCCCTG CAGGGCATT TCAAAAAA AAAAAAAA	1088
AAAAAAAA AA	1100

(2) INFORMATION FOR SEQ ID NO:6:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 314 amino acids

(B) TYPE: amino acid

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(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

Met Gly Ala Arg Gly Ala Leu Leu Leu Ala Leu Leu Leu Ala Arg Ala
 1 5 10 15
 Gly Leu Arg Lys Pro Glu Ser Gln Glu Ala Ala Pro Leu Ser Gly Pro
 20 25 30
 Cys Gly Arg Arg Val Ile Thr Ser Arg Ile Val Gly Gly Glu Asp Ala
 35 40 45
 Glu Leu Gly Arg Trp Pro Trp Gln Gly Ser Leu Arg Leu Trp Asp Ser
 50 55 60
 His Val Cys Gly Val Ser Leu Leu Ser His Arg Trp Ala Leu Thr Ala
 65 70 75 80
 Ala His Cys Phe Glu Thr Tyr Ser Asp Leu Ser Asp Pro Ser Gly Trp
 85 90 95
 Met Val Gln Phe Gly Gln Leu Thr Ser Met Pro Ser Phe Trp Ser Leu
 100 105 110
 Gln Ala Tyr Tyr Thr Arg Tyr Phe Val Ser Asn Ile Tyr Leu Ser Pro
 115 120 125
 Arg Tyr Leu Gly Asn Ser Pro Tyr Asp Ile Ala Leu Val Lys Leu Ser
 130 135 140
 Ala Pro Val Thr Tyr Thr Lys His Ile Gln Pro Ile Cys Leu Gln Ala
 145 150 155 160
 Ser Thr Phe Glu Phe Glu Asn Arg Thr Asp Cys Trp Val Thr Gly Trp
 165 170 175
 Gly Tyr Ile Lys Glu Asp Glu Ala Leu Pro Ser Pro His Thr Leu Gln
 180 185 190
 Glu Val Gln Val Ala Ile Ile Asn Asn Ser Met Cys Asn His Leu Phe
 195 200 205

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Leu Lys Tyr Ser Phe Arg Lys Asp Ile Phe Gly Asp Met Val Cys Ala
210 215 220

Gly Asn Ala Gln Gly Gly Lys Asp Ala Cys Phe Gly Asp Ser Gly Gly
225 230 235 240

Pro Leu Ala Cys Asn Lys Asp Gly Leu Trp Tyr Gln Ile Gly Val Val
245 250 255

Ser Trp Gly Val Gly Cys Gly Arg Pro Asn Arg Pro Gly Val Tyr Thr
260 265 270

Asn Ile Ser His His Phe Glu Trp Ile Gln Lys Leu Met Ala Gln Ser
275 280 285

Gly Met Ser Gln Pro Asp Pro Ser Trp Pro Leu Leu Phe Phe Pro Leu
290 295 300

Leu Trp Ala Leu Pro Leu Leu Gly Pro Val
305 310

(2) INFORMATION FOR SEQ ID NO:7:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 799 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 24..799

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

AGTTCAGATG AATGGGACTG TGA GAA CCA TCT GTG ACC AAA TTG ATA CAG 50
Glu Pro Ser Val Thr Lys Leu Ile Gln
1 5

GAA CAG GAG AAA GAG CCG CGG TGG CTG ACA TTA CAC TCC AAC TGG GAG 98

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190	195	200	
GGC AAT AAA ATG CCA TTT AAG CTG CAA GAG GGA GAG GTC CGC ATT ATT			674
Gly Asn Lys Met Pro Phe Lys Leu Gln Glu Gly Glu Val Arg Ile Ile			
205	210	215	
TCT CTG GAA CAT TGT CAG TCC TAC TTT GAC ATG AAG ACC ATC ACC ACT			722
Ser Leu Glu His Cys Gln Ser Tyr Phe Asp Met Lys Thr Ile Thr Thr			
220	225	230	
CGG ATG ATA TGT GCT GGC TAT GAG TCT GGC ACA GTT GAT TCA TGC ATG			770
Arg Met Ile Cys Ala Gly Tyr Glu Ser Gly Thr Val Asp Ser Cys Met			
235	240	245	
GGT GAC TGG GGC GGT CCG TTG AAT TCT GT			799
Gly Asp Trp Gly Gly Pro Leu Asn Ser			
250	255		

(2) INFORMATION FOR SEQ ID NO:8:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 258 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

Glu Pro Ser Val Thr Lys Leu Ile Gln Glu Gln Glu Lys Glu Pro Arg			
1	5	10	15
Trp Leu Thr Leu His Ser Asn Trp Glu Ser Leu Asn Gly Thr Thr Leu			
20	25	30	
His Glu Leu Val Val Asn Gly Gln Ser Cys Glu Ser Arg Ser Lys Ile			
35	40	45	
Ser Leu Leu Cys Thr Lys Gln Asp Cys Gly Arg Arg Pro Ala Ala Arg			
50	55	60	
Met Asn Lys Arg Ile Leu Gly Gly Arg Thr Ser Arg Pro Gly Arg Trp			
65	70	75	80

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Pro Trp Gln Cys Ser Leu Gln Ser Glu Pro Ser Gly His Ile Cys Gly
85 90 95

Cys Val Leu Ile Ala Lys Lys Trp Val Val Thr Val Ala His Cys Phe
100 105 110

Glu Gly Arg Glu Asn Ala Ala Val Trp Lys Val Val Leu Gly Ile Asn
115 120 125

Asn Leu Asp His Pro Ser Val Phe Met Gln Thr Arg Phe Val Arg Thr
130 135 140

Ile Ile Leu His Pro Arg Tyr Ser Arg Ala Val Val Asp Tyr Asp Ile
145 150 155 160

Ser Ile Val Glu Leu Ser Glu Asp Ile Ser Glu Thr Gly Tyr Val Arg
165 170 175

Pro Val Cys Leu Pro Asn Pro Glu Gln Trp Leu Glu Pro Asp Thr Tyr
180 185 190

Cys Tyr Ile Thr Gly Trp Gly His Met Gly Asn Lys Met Pro Phe Lys
195 200 205

Leu Gln Glu Gly Glu Val Arg Ile Ile Ser Leu Glu His Cys Gln Ser
210 215 220

Tyr Phe Asp Met Lys Thr Ile Thr Thr Arg Met Ile Cys Ala Gly Tyr
225 230 235 240

Glu Ser Gly Thr Val Asp Ser Cys Met Gly Asp Trp Gly Gly Pro Leu
245 250 255

Asn Ser

(2) INFORMATION FOR SEQ ID NO:9:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 2241 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

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(ix) FEATURE:

(A) NAME/KEY: CDS

(B) LOCATION: 166..1773

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

ATTTAATACG ACTCACTATA GGGAATTGG CCCTCGAGGA AGAATTCGGC ACGAGGCTGC	60
GGCGCACTGT GAGGGAGTCG CTGTGATCCG GGGCCCCGAA CCCGACTGGA GCTGAAGCGC	120
AGGCTGCGGG GCGCGGAGTC GGGAGGCCTG AGTGTTCCTT CCAGC ATG TCG GAG	174
Met Ser Glu	
1	
GGG GAG TCC CAG ACA GTA CTT AGC AGT GGC TCA GAC CCA AAG GTA GAA	222
Gly Glu Ser Gln Thr Val Leu Ser Ser Gly Ser Asp Pro Lys Val Glu	
5 10 15	
TCT TCA TCT TCA GCT CCT GGC CTG ACA TCA GTG TCA CCT CCT GTG ACC	270
Ser Ser Ser Ser Ala Pro Gly Leu Thr Ser Val Ser Pro Pro Val Thr	
20 25 30 35	
TQC ACA ACC TCA GCT GCT TCC CCA GAG GAA GAA GAA GAA AGT GAA GAT	318
Ser Thr Thr Ser Ala Ala Ser Pro Glu Glu Glu Glu Glu Ser Glu Asp	
40 45 50	
GAG TCT GAG ATT TTG GAA GAG TCG CCC TCT GGG CGC TGG CAG AAG AGG	366
Glu Ser Glu Ile Leu Glu Glu Ser Pro Cys Gly Arg Trp Gln Lys Arg	
55 60 65	
CGA GAA GAG GTG AAT CAA CGG AAT GTA CCA GGT ATT GAC AGT GCA TAC	414
Arg Glu Glu Val Asn Gln Arg Asn Val Pro Gly Ile Asp Ser Ala Tyr	
70 75 80	
CTG GCC ATG GAT ACA GAG GAA GGT GTA GAG GTT GTG TGG AAT GAG GTA	462
Leu Ala Met Asp Thr Glu Glu Gly Val Glu Val Val Trp Asn Glu Val	
85 90 95	
CAG TTC TCT GAA CGC AAG AAC TAC AAG CTG CAG GAG GAA AAG GTT TGT	510
Gln Phe Ser Glu Arg Lys Asn Tyr Lys Leu Gln Glu Glu Lys Val Cys	
100 105 110 115	
GCT GTG TTT GAT AAT TTG ATT CAA TTG GAG CAT CTT AAC ATT GTT AAG	558

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Ala Val Phe Asp Asn Leu Ile Gln Leu Glu His Leu Asn Ile Val Lys	
120 125 130	
TTT CAC AAA TAT TGG GCT GAC ATT AAA GAG AAC AAG GCC AGG GTC ATT	606
Phe His Lys Tyr Trp Ala Asp Ile Lys Glu Asn Lys Ala Arg Val Ile	
135 140 145	
TTT ATC ACA GGA TAC ATG TCA TCT GGG AGT CTG AAG CAA TTT CTG AAG	654
Phe Ile Thr Gly Tyr Met Ser Ser Gly Ser Leu Lys Gln Phe Leu Lys	
150 155 160	
AAG ACC CAA AAG AAC CAC CAG ACG ATG AAT GAA AAG GCA TGG AAG CGT	702
Lys Thr Gln Lys Asn His Gln Thr Met Asn Glu Lys Ala Trp Lys Arg	
165 170 175	
TGG TGC ACA CAA ATC CTC TCT GCC CTA AGC TAC CTG CAC TCC TGT GAC	750
Trp Cys Thr Gln Ile Leu Ser Ala Leu Ser Tyr Leu His Ser Cys Asp	
180 185 190 195	
CCC CCC ATC ATC CAT GGG AAC CTG ACC TGT GAC ACC ATC TTC ATC CAG	798
Pro Pro Ile Ile His Gly Asn Leu Thr Cys Asp Thr Ile Phe Ile Gln	
200 205 210	
CAC AAC GGA CTC ATC AAG ATT GGC TCT GTG GCT CCT GAC ACT ATC AAC	846
His Asn Gly Leu Ile Lys Ile Gly Ser Val Ala Pro Asp Thr Ile Asn	
215 220 225	
AAT CAT GTG AAG ACT TGT CGA GAA GAG CAG AAG AAT CTA CAC TTC TTT	894
Asn His Val Lys Thr Cys Arg Glu Glu Gln Lys Asn Leu His Phe Phe	
230 235 240	
GCA CCA GAG TAT GGA GAA GTC ACT AAT GTG ACA ACA GCA GTG GAC ATC	942
Ala Pro Glu Tyr Gly Glu Val Thr Asn Val Thr Thr Ala Val Asp Ile	
245 250 255	
TAC TCC TTT GGC ATG TGT GCA CTG GGG ATG GCA GTG CTG GAG ATT CAG	990
Tyr Ser Phe Gly Met Cys Ala Leu Gly Met Ala Val Leu Glu Ile Gln	
260 265 270 275	
GGC AAT GGA GAG TCC TCA TAT GTG CCA CAG GAA GCC ATC AGC AGT GCC	1038
Gly Asn Gly Glu Ser Ser Tyr Val Pro Gln Glu Ala Ile Ser Ser Ala	
280 285 290	
ATC CAG CTT CTA GAA GAC CCA TTA CAG AGG GAG TTC ATT CAA AAG TGC	1086
Ile Gln Leu Leu Glu Asp Pro Leu Gln Arg Glu Phe Ile Gln Lys Cys	

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295	300	305	
CTG CAG TCT GAG CCT GCT CGC AGA CCA ACA GCC AGA GAA CTT CTG TTC			1134
Leu Gln Ser Glu Pro Ala Arg Arg Pro Thr Ala Arg Glu Leu Leu Phe			
310	315	320	
CAC CCA GCA TTG TTT GAA GTG CCC TCG CTC AAA CTC CTT GCG GCC CAC			1182
His Pro Ala Leu Phe Glu Val Pro Ser Leu Lys Leu Leu Ala Ala His			
325	330	335	
TGC ATT GTG GGA CAC CAA CAC ATG ATC CCA GAG AAC GCT CTA GAG GAG			1230
Cys Ile Val Gly His Gln His Met Ile Pro Glu Asn Ala Leu Glu Glu			
340	345	350 355	
ATC ACC AAA AAC ATG GAT ACT AGT GCC GTA CTG GCT GAA ATC CCT GCA			1278
Ile Thr Lys Asn Met Asp Thr Ser Ala Val Leu Ala Glu Ile Pro Ala			
360	365	370	
GGA CCA GGA AGA GAA CCA GTT CAG ACT TTG TAC TCT CAG TCA CCA GCT			1326
Gly Pro Gly Arg Glu Pro Val Gln Thr Leu Tyr Ser Gln Ser Pro Ala			
375	380	385	
CTG GAA TTA GAT AAA TTC CTT GAA GAT GTC AGG AAT GGG ATC TAT CCT			1374
Leu Glu Leu Asp Lys Phe Leu Glu Asp Val Arg Asn Gly Ile Tyr Pro			
390	395	400	
CTG ACA GCC TTT GGG CTG CCT CGG CCC CAG CAG CCA CAG CAG GAG GAG			1422
Leu Thr Ala Phe Gly Leu Pro Arg Pro Gln Gln Pro Gln Gln Glu Glu			
405	410	415	
GTG ACA TCA CCT GTC GTG CCC CCC TCT GTC AAG ACT CCG ACA CCT GAA			1470
Val Thr Ser Pro Val Val Pro Pro Ser Val Lys Thr Pro Thr Pro Glu			
420	425	430 435	
CCA GCT GAG GTG GAG ACT CGC AAG GTG GTG CTG ATG CAG TGC AAC ATT			1518
Pro Ala Glu Val Glu Thr Arg Lys Val Val Leu Met Gln Cys Asn Ile			
440	445	450	
GAG TCG GTG GAG GAG GGA GTC AAA CAC CAC CTG ACA CTT CTG CTG AAG			1566
Glu Ser Val Glu Glu Gly Val Lys His His Leu Thr Leu Leu Leu Lys			
455	460	465	
TTG GAG GAC AAA CTG AAC CGG CAC CTG AGC TGT GAC CTG ATG CCA AAT			1614
Leu Glu Asp Lys Leu Asn Arg His Leu Ser Cys Asp Leu Met Pro Asn			
470	475	480	

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GAG AAT ATC CCC GAG TTG GCG GCT GAG CTG GTG CAG CTG GGC TTC ATT	1662
Glu Asn Ile Pro Glu Leu Ala Ala Glu Leu Val Gln Leu Gly Phe Ile	
485 490 495	
AGT GAG GCT GAC CAG AGC CGG TTG ACT TCT CTG CTA GAA GAG ACC TTG	1710
Ser Glu Ala Asp Gln Ser Arg Leu Thr Ser Leu Leu Glu Glu Thr Leu	
500 505 510 515	
AAC AAG TTC AAT TTT GCC AGG AAC AGT ACC CTC AAC TCA GCC GCT GTC	1758
Asn Lys Phe Asn Phe Ala Arg Asn Ser Thr Leu Asn Ser Ala Ala Val	
520 525 530	
ACC GTC TCC TCT TAGAGCTCAC TCGGGCCAGG CCCTGATCTG CGCTGTGGCT	1810
Thr Val Ser Ser	
535	
GTCCCTGGAC GTGCTGCAGC CCTCCTGTCC CTCCCCCCA GTCAGTATTA CCCTGTGAAG	1870
CCCCCTCCCT CCTTTATTAT TCAGGAGGGC TGGGGGGGCT CCCTGTTTCT GAGCATCATC	1930
CTTCCCTC CCCTCTCTTC CTCCCCTCTG CACTTTGTTT ACTTGTTTTC CACAGACGTG	1990
GGCCTGGGCC TTCTCAGCAG CCGCCTTCTA GTTGGGGGCT AGTCGCTGAT CTGCCGGCTC	2050
CCGCCAGCC TGTGTGGAAG GGAGGCCAC GGGCACTAGG GGAGCCGAAT TCTACAATCC	2110
CGCTGGGGCG GCCGGGGCGG GAGAGAAAGG TGGTGCTGCA GTGGTGCCCC TGGGGGGCCA	2170
TTGATTTCGCT CTCAGTTGCT GCTGTAATAA AAGTCTACTT TTTGCTAAAA AAAAAAAAAA	2230
AAAAAAAAA A	2241

(2) INFORMATION FOR SEQ ID NO:10:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 535 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

Met Ser Glu Gly Glu Ser Gln Thr Val Leu Ser Ser Gly Ser Asp Pro

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1	5	10	15
Lys Val Glu Ser Ser Ser Ser Ala Pro Gly Leu Thr Ser Val Ser Pro			
20	25	30	
Pro Val Thr Ser Thr Thr Ser Ala Ala Ser Pro Glu Glu Glu Glu Glu			
35	40	45	
Ser Glu Asp Glu Ser Glu Ile Leu Glu Glu Ser Pro Cys Gly Arg Trp			
50	55	60	
Gln Lys Arg Arg Glu Glu Val Asn Gln Arg Asn Val Pro Gly Ile Asp			
65	70	75	80
Ser Ala Tyr Leu Ala Met Asp Thr Glu Glu Gly Val Glu Val Val Trp			
85	90	95	
Asn Glu Val Gln Phe Ser Glu Arg Lys Asn Tyr Lys Leu Gln Glu Glu			
100	105	110	
Lys Val Cys Ala Val Phe Asp Asn Leu Ile Gln Leu Glu His Leu Asn			
115	120	125	
Ile Val Lys Phe His Lys Tyr Trp Ala Asp Ile Lys Glu Asn Lys Ala			
130	135	140	
Arg Val Ile Phe Ile Thr Gly Tyr Met Ser Ser Gly Ser Leu Lys Gln			
145	150	155	160
Phe Leu Lys Lys Thr Gln Lys Asn His Gln Thr Met Asn Glu Lys Ala			
165	170	175	
Trp Lys Arg Trp Cys Thr Gln Ile Leu Ser Ala Leu Ser Tyr Leu His			
180	185	190	
Ser Cys Asp Pro Pro Ile Ile His Gly Asn Leu Thr Cys Asp Thr Ile			
195	200	205	
Phe Ile Gln His Asn Gly Leu Ile Lys Ile Gly Ser Val Ala Pro Asp			
210	215	220	
Thr Ile Asn Asn His Val Lys Thr Cys Arg Glu Glu Gln Lys Asn Leu			
225	230	235	240
His Phe Phe Ala Pro Glu Tyr Gly Glu Val Thr Asn Val Thr Thr Ala			

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245	250	255
Val Asp Ile Tyr Ser Phe Gly Met Cys Ala Leu Gly Met Ala Val Leu		
260	265	270
Glu Ile Gln Gly Asn Gly Glu Ser Ser Tyr Val Pro Gln Glu Ala Ile		
275	280	285
Ser Ser Ala Ile Gln Leu Leu Glu Asp Pro Leu Gln Arg Glu Phe Ile		
290	295	300
Gln Lys Cys Leu Gln Ser Glu Pro Ala Arg Arg Pro Thr Ala Arg Glu		
305	310	315
Leu Leu Phe His Pro Ala Leu Phe Glu Val Pro Ser Leu Lys Leu Leu		
325	330	335
Ala Ala His Cys Ile Val Gly His Gln His Met Ile Pro Glu Asn Ala		
340	345	350
Leu Glu Glu Ile Thr Lys Asn Met Asp Thr Ser Ala Val Leu Ala Glu		
355	360	365
Ile Pro Ala Gly Pro Gly Arg Glu Pro Val Gln Thr Leu Tyr Ser Gln		
370	375	380
Ser Pro Ala Leu Glu Leu Asp Lys Phe Leu Glu Asp Val Arg Asn Gly		
385	390	395
Ile Tyr Pro Leu Thr Ala Phe Gly Leu Pro Arg Pro Gln Gln Pro Gln		
405	410	415
Gln Glu Glu Val Thr Ser Pro Val Val Pro Pro Ser Val Lys Thr Pro		
420	425	430
Thr Pro Glu Pro Ala Glu Val Glu Thr Arg Lys Val Val Leu Met Gln		
435	440	445
Cys Asn Ile Glu Ser Val Glu Glu Gly Val Lys His His Leu Thr Leu		
450	455	460
Leu Leu Lys Leu Glu Asp Lys Leu Asn Arg His Leu Ser Cys Asp Leu		
465	470	475
Met Pro Asn Glu Asn Ile Pro Glu Leu Ala Ala Glu Leu Val Gln Leu		

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485

490

495

Gly Phe Ile Ser Glu Ala Asp Gln Ser Arg Leu Thr Ser Leu Leu Glu
500 505 510

Glu Thr Leu Asn Lys Phe Asn Phe Ala Arg Asn Ser Thr Leu Asn Ser
515 520 525

Ala Ala Val Thr Val Ser Ser
530 535

(2) INFORMATION FOR SEQ ID NO:11:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 39 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

GCACAGTCGA CCAAGCCGGA GTCGCAGAG

39

(2) INFORMATION FOR SEQ ID NO:12:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 30 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

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GCACAAAGCT TGCCAGGAGG GGTCTGGCTG

30

(2) INFORMATION FOR SEQ ID NO:13:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 32 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:13:

GCACAACCAT GGCCAAGCCG GAGTCGCAGG AG

32

(2) INFORMATION FOR SEQ ID NO:14:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 29 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

GCACAAGATC TCCAGGAGGG GTCTGGCTG

29

(2) INFORMATION FOR SEQ ID NO:15:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 14 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:15:

Lys Pro Glu Ser Gln Glu Ala Ala Pro Leu Ser Gly Pro Cys

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10

(2) INFORMATION FOR SEQ ID NO:16:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 19 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:16:

Glu Asp Ala Glu Leu Gly Arg Trp Pro Trp Gln Gly Ser Leu Arg Leu Trp Asp

15

Cys

(2) INFORMATION FOR SEQ ID NO:17:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 17 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:17:

Gly Tyr Ile Lys Glu Asp Glu Ala Leu Pro Ser Pro His Thr Leu Gln Cys

15

(2) INFORMATION FOR SEQ ID NO:18:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 29 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: single
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(xi). SEQUENCE DESCRIPTION: SEQ ID NO:18:

GCACAGGTAC CGAGGCCATG GGCGCGCGC

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(2) INFORMATION FOR SEQ ID NO:19:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 50 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:19:

GCACATCTAG ATCAGTGGTG GTGGTGGTGG TGGACCGGCC CCAGGAGTGG 50

(2) INFORMATION FOR SEQ ID NO:20:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 31 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:20:

GCACAGCGGC CGCGAGGCCA TGGGCGCGCG C 31

(2) INFORMATION FOR SEQ ID NO:21:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 52 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:21:

GCACAGCGGC CGCTCAGTGG TGGTGGTGGT GGTGCCAGGA GGGGTCTGGC TG 52

(2) INFORMATION FOR SEQ ID NO:22:

- (i) SEQUENCE CHARACTERISTICS:

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- (A) LENGTH: 20 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:22:

CTGACTTCCA TGCCATCCTT

20

(2) INFORMATION FOR SEQ ID NO:23:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 20 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:23:

GCTCAGGACT CCAATCTGAT

20

(2) INFORMATION FOR SEQ ID NO:24:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 5 amino acids
 - (B) TYPE: amino acid
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:24:

Arg Ile Val Gly Gly

5

(2) INFORMATION FOR SEQ ID NO:25:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 959 base pairs
 - (B) TYPE: nucleic acid

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(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(ix) FEATURE:

(A) NAME/KEY: CDS

(B) LOCATION: 2..856

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:25:

C GAC CTA TTG TCA GGG CCC TGC GGT CAC AGG ACC ATC CCT TCC CGT	46
Asp Leu Leu Ser Gly Pro Cys Gly His Arg Thr Ile Pro Ser Arg	
1 5 10 15	
ATA GTG GGT GGC GAT GAT GCT GAG CTT GGC CGC TGG CCG TGG CAA GGC	94
Ile Val Gly Gly Asp Asp Ala Glu Leu Gly Arg Trp Pro Trp Gln Gly	
20 25 30	
AGC CTG CGT GTA TGG GGC AAC CAC TTA TGT GGC GCA ACC TTG CTC AAC	142
Ser Leu Arg Val Trp Gly Asn His Leu Cys Gly Ala Thr Leu Leu Asn	
35 40 45	
CGC CGC TGG GTG CTT ACA GCT GCC CAC TGC TTC CAA AAG GAT AAC GAT	190
Arg Arg Trp Val Leu Thr Ala Ala His Cys Phe Gln Lys Asp Asn Asp	
50 55 60	
CCT TTT GAC TGG ACA GTC CAG TTT GGT GAG CTG ACT TCC AGG CCA TCT	238
Pro Phe Asp Trp Thr Val Gln Phe Gly Glu Leu Thr Ser Arg Pro Ser	
65 70 75	
CTC TGG AAC CTA CAG GCC TAT TCC AAC CGT TAC CAA ATA GAA GAT ATT	286
Leu Trp Asn Leu Gln Ala Tyr Ser Asn Arg Tyr Gln Ile Glu Asp Ile	
80 85 90 95	
TTC CTG AGC CCC AAG TAC TCG GAG CAG TAT CCC AAT GAC ATA GCC CTG	334
Phe Leu Ser Pro Lys Tyr Ser Glu Gln Tyr Pro Asn Asp Ile Ala Leu	
100 105 110	
CTG AAG CTG TCA TCT CCA GTC ACC TAC AAT AAC TTC ATC CAG CCC ATC	382
Leu Lys Leu Ser Ser Pro Val Thr Tyr Asn Asn Phe Ile Gln Pro Ile	
115 120 125	

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TGC CTC CTG AAC TCC ACG TAC AAG TTT GAG AAC CGA ACT GAC TGC TGG Cys Leu Leu Asn Ser Thr Tyr Lys Phe Glu Asn Arg Thr Asp Cys Trp 130 135 140	430
GTG ACC GGC TGG GGG GCT ATT GGA GAA GAT GAG AGT CTG CCA TCT CCC Val Thr Gly Trp Gly Ala Ile Gly Glu Asp Glu Ser Leu Pro Ser Pro 145 150 155	478
AAC ACT CTC CAG GAA GTG CAG GTA GCT ATT ATC AAC AAC AGC ATG TGT Asn Thr Leu Gln Glu Val Gln Val Ala Ile Ile Asn Asn Ser Met Cys 160 165 170 175	526
AAC CAT ATG TAC AAA AAG CCA GAC TTC CGC ACG AAC ATC TGG GGA GAC Asn His Met Tyr Lys Lys Pro Asp Phe Arg Thr Asn Ile Trp Gly Asp 180 185 190	574
ATG GTT TGC GCT GGC ACT CCT GAA GGT GGC AAG GAT GCC TGC TTT GGT Met Val Cys Ala Gly Thr Pro Glu Gly Gly Lys Asp Ala Cys Phe Gly 195 200 205	622
GAC TCG GGA GGA CCC TTG GCC TGC GAC CAG GAT ACG GTG TGG TAT CAG Asp Ser Gly Gly Pro Leu Ala Cys Asp Gln Asp Thr Val Trp Tyr Gln 210 215 220	670
GTT GGA GTT GTG AGC TGG GGA ATA GGC TGT GGT CGC CCC AAT CGC CCT Val Gly Val Val Ser Trp Gly Ile Gly Cys Gly Arg Pro Asn Arg Pro 225 230 235	718
GGA GTC TAT ACC AAC ATC AGT CAT CAC TAC AAC TGG ATC CAG TCA ACC Gly Val Tyr Thr Asn Ile Ser His His Tyr Asn Trp Ile Gln Ser Thr 240 245 250 255	766
ATG ATC CGC AAT GGG CTG CTC AGG CCT GAC CCA GTC CCC TTG CTA CTG Met Ile Arg Asn Gly Leu Leu Arg Pro Asp Pro Val Pro Leu Leu Leu 260 265 270	814
TTT CTT ACT CTG GCC TGG GCT TCC TCT TTG CTG AGG CCT GCC Phe Leu Thr Leu Ala Trp Ala Ser Ser Leu Leu Arg Pro Ala 275 280 285	856
TGAGCCCA CGTGTACGTC ACACCTGTGA GGTCAGGGTG TGTCTCTTTT GTATCTTGCT	916
TGCTAATAAA CCTGTTAATA TTTAAAAAAA AAAAAAAAAA AAA	959

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(2) INFORMATION FOR SEQ ID NO:26:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 285 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:26:

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Asp Leu Leu Ser Gly Pro Cys Gly His Arg Thr Ile Pro Ser Arg Ile
 1             5             10             15

Val Gly Gly Asp Asp Ala Glu Leu Gly Arg Trp Pro Trp Gln Gly Ser
      20             25             30

Leu Arg Val Trp Gly Asn His Leu Cys Gly Ala Thr Leu Leu Asn Arg
      35             40             45

Arg Trp Val Leu Thr Ala Ala His Cys Phe Gln Lys Asp Asn Asp Pro
      50             55             60

Phe Asp Trp Thr Val Gln Phe Gly Glu Leu Thr Ser Arg Pro Ser Leu
      65             70             75             80

Trp Asn Leu Gln Ala Tyr Ser Asn Arg Tyr Gln Ile Glu Asp Ile Phe
      85             90             95

Leu Ser Pro Lys Tyr Ser Glu Gln Tyr Pro Asn Asp Ile Ala Leu Leu
      100             105             110

Lys Leu Ser Ser Pro Val Thr Tyr Asn Asn Phe Ile Gln Pro Ile Cys
      115             120             125

Leu Leu Asn Ser Thr Tyr Lys Phe Glu Asn Arg Thr Asp Cys Trp Val
      130             135             140

Thr Gly Trp Gly Ala Ile Gly Glu Asp Glu Ser Leu Pro Ser Pro Asn
      145             150             155             160

Thr Leu Gln Glu Val Gln Val Ala Ile Ile Asn Asn Ser Met Cys Asn
      165             170             175

His Met Tyr Lys Lys Pro Asp Phe Arg Thr Asn Ile Trp Gly Asp Met

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180	185	190
Val Cys Ala Gly Thr Pro Glu Gly Gly Lys Asp Ala Cys Phe Gly Asp		
195	200	205
Ser Gly Gly Pro Leu Ala Cys Asp Gln Asp Thr Val Trp Tyr Gln Val		
210	215	220
Gly Val Val Ser Trp Gly Ile Gly Cys Gly Arg Pro Asn Arg Pro Gly		
225	230	235
Val Tyr Thr Asn Ile Ser His His Tyr Asn Trp Ile Gln Ser Thr Met		
245	250	255
Ile Arg Asn Gly Leu Leu Arg Pro Asp Pro Val Pro Leu Leu Leu Phe		
260	265	270
Leu Thr Leu Ala Trp Ala Ser Ser Leu Leu Arg Pro Ala		
275	280	285

(2) INFORMATION FOR SEQ ID NO:27:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 3866 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:27:

AGTGAGTCTC CTGCCTCAGC CTCCCAAGTA GCTGGGACTT CAGGTGTGTG CCACCATCCT	60
CAGCTAATTT TTTTTTTTTT TTTTTTTTG AGAAGGAGTC TTGCTCTGTC GCCCAGGCTG	120
GAGTGCAGTG GCGCGATCTT CCAGGCCCCA CCGGGCCCTC AGGAAGGCCT TGCCTACCTG	180
CTTTAAGGGG ACTCCTGGCT CAGGGCCAGG CCCCTGGTGC TGGAGGAGGT GGTGGGTGGA	240
GGGCAGGGGG CACCAAGCGG GCAGCCAGGA CCCCCGGGCT GCAGACAAGA AAAGGACTGT	300

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GGGGTCCACC GGGTCTGGGC CACATCAAGG AATGTGGTTG AAGACCCGCC CTTAGGAGCT 360
GAAAGCCAGG GCGCTACCAG GCCTGAGAGG CCCCAAACAG CCCTTGGGCC TGGTTTGGGA 420
GGATTAAGCT GGAGCTCCCA ACCCGCCCTG CCCCAGGGG GCGACCCCGG GCCCGGCGCG 480
AGAGGAGGCA GAGGGGGCGT CAGGCCGCGG GAGAGGAGGC CATGGGCGCG CGCGGGGCGC 540
TGCTGCTGGC GCTGCTGCTG GCTCGGGCTG GACTCAGGAA GCCGGGTGAG CTCGGGGCGC 600
TGCTGGCGGG ATGGGGAGGC GGGGGAGCGG TGGGGAGGAC GGGAGGTGGA GGCCGCGGGG 660
AGTCACTTCT TGTCTCCCGC AGAGTCGCAG GAGGCGGCGC CGTTATCAGG TAGGGCGCCC 720
AGGACGCGCG ATTCCTGCCA GGGCCGTTGG GCCGAGGTGG ACGGGGGGCG GTGAGGGGGT 780
AGAGGGGGGC CTTTACTGCT CTCTCGCCCC CGCCCCGGG ATCGAGAACT CTGTTGGCGT 840
GGAAAGTAAC TAACGGACGC TGGAGGGGGA TGGGCGGGCC CTGCAGAGCA CGTGGGAGGA 900
TCTCCAGTGT CACCTACTTC CTGCTGCACA CACGCGAGGG GACCCTGGGT GGGCAAAAAC 960
GTGCTTTCCC GGACGGGGTT GAAGGGGAGA AAGGGAGAGG TCGGGCTTGG GGGGCTGCCT 1020
CCCGCGGCTC AGCAGTTCCT CTGACCATCC GAGGACCATG CGGCCGACGG GTCATCACGT 1080
CGCGCATCGT GGGTGGAGAG GACGCCGAAC TCGGGCGTTG GCCGTGGCAG GGGAGCCTGC 1140
GCCTGTGGGA TTCCACGTA TGCGGAGTGA GCCTGCTCAG CCACCGCTGG GCACTCACGG 1200
CGGCGCACTG CTTTGAAACG TGAGTGGGGG TGCGAACGGA GGGGTGCGGG GACGGGCAGG 1260
AACAGGGCTG GAGGGAGTGC CACCGAACTT TACCTCTGGT CTGATGCCAG ACTTGGGCGT 1320
GAAAGTTGTG CGTGGATGCG GCCTGGTGTT CTCCTGAGCC CCAGGCTGTG CTGCAGCCGG 1380
TTACACCCAC TCCAGTTCCC TTTGGGTCTC CTGGAGGGAA CCCTGTTCAG GTTATTCCAG 1440
AATGTTCTTC CAGAACATTT CCACACACTT TTGGGTATTC TCTCCCTTTT TCTTTCAACC 1500
CAAAGTTCAC CACTGACCAT CCCACCCTCA TCCCCCTCC TGGTGGACGG TGCGGTACAG 1560
TGTGGGGCAC TGAGCCAAGG CCAGCACCCC CGGGCCGCTG TGTGGACTCC ATCCTGCCAA 1620
TCCCACATTG GCGTGGTGCA TCTCCCCATT CCTCCTTGGG CTGCATGGGG GTGCCCCCTG 1680

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AGGCCTTGGC TCAATGCAAG GCTCCTTGGG ACAGCTCTGG GAGGTGACAA GACCCACCCC	1740
TTCTGCTGCA GGAGCAGGTC CTAGGACTTT GGTGTGGTC TGTCTGGGCT CCTTCATTTC	1800
TGCAGGGGAC CCTGGGTGTT AGCAAGTAGC AGCAACACCA CAGTTTCCCC TCCTGCACTG	1860
GACCCCAAGT GTGCTCAGGT AGCCAGCCCT CCATCCAGGG CCCCTGACTG CTCTCTCTC	1920
TTCTGCCAGC TATAGTGACC TTAGTGATCC CTCCGGGTGG ATGGTCCAGT TTGGCCAGCT	1980
GACTTCCATG CCATCCTTCT GGAGCCTGCA GGCCTACTAC ACCCGTTACT TCGTATCGAA	2040
TATCTATCTG AGCCCTCGCT ACCTGGGGAA TTCACCCTAT GACATTGCCT TGGTGAAGCT	2100
GTCTGCACCT GTCACCTACA CTAAACACAT CCAGCCCATC TGTCTCCAGG CCTCCACATT	2160
TGAGTTTGAG AACCGGACAG ACTGCTGGGT GACTGGCTGG GGGTACATCA AAGAGGATGA	2220
GGGTGAGGCT GGGGACAGGC GGGTCAGGGA GGAAGTGTCT TTGTTCACCT GTTCCCTGCT	2280
ATAGGCACAA TAGCCCCCTG CTTGGTCTGG GGGTGCAGGC TATGCCCCCTC TTGCTTGCAG	2340
TCTCTCCTCA CCTGCCAGGG CAGGGACCAA ACACCCAGTT CTCTCCCTTC CAGGGGCTGT	2400
GGGGGCCAGA AGGAGAGTGT GAGAGGGAGG CCAGTTTGGC GCAAGCCTGT GGGTGGTGCG	2460
GTGGTGGAGG GGTCTGGAG GGCTTGGCGA CATAAACCTC ATACTTGGAT TTATTCCTGC	2520
ATCTTTCCAC CTCCCCAGT GCTCACCAAT GCCCAGGCA TCACCAGGT GCCCCTTCCC	2580
CCAAGGTCTG GCTTTGGATG CTTATGTGAA CACCGTTTA AGTTGCCTTG GCCCCTTCT	2640
CGGTTCCCTT TTGGCTGAGG AATCTCTCCA TGGCTGCAGG CAGGGCCATT GTTGCCATTC	2700
TACAGATAGG GAAAGTGCGG CTGGGGGAGC TCTGACAGCT GTCCCTCCCC GGGGCCTTCT	2760
GTGATGCTGC TGAGGGCCTC TGTTGTGCTG GGGTCTGGGT TGGAGCTGGG GGTAAATGGAG	2820
ATGAACCTGC CAGGCACAGT GGGTGCCCCA GGGCCCCAC CCCCAGGCC TATGCCATCC	2880
CTCCATAGAG GGGCCTCAGG TTGCTGTCTC TCTCCTTCCC ACTATCGTCC GCACAGCACT	2940
GCCATCTCCC CACACCCTCC AGGAAGTTCA GGTGCCATC ATAAACAAC CTATGTGCAA	3000
CCACCTCTTC CTCAAGTACA GTTCCGCAA GGACATCTT GGAGACATGG TTTGTGCTGG	3060

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CAATGCCCAA GGCGGGAAGG ATGCCTGCTT CGTGAGTGTC CTTGCCACCA CTCCCAGCCC 3120
AGGAAAGCAT CCTGTGTCCC TGTGCCTTAT TTGACCCTCA TGCCAACCCC GGGAGGTGGA 3180
GACTGTTGCC CCACTCTGCA GATGCAGAAA CGGAGGCTTG GCTGCTGCCA GGGGGAGGAG 3240
GAGGATGTGC ACCCAGTCTA CCCAGCCCCA TAGCCCTTCC CACTCTCAGC CCCTCCCCTG 3300
CCCCACTCAC TCTGCCCCAG GCTGACCTCA GCCCCGCTGC TCCCCAGGGT GACTCAGGTG 3360
GACCCTTGGC CTGTAACAAG AATGGACTGT GGTATCAGAT TGGAGTCGTG AGCTGGGGAG 3420
TGGGCTGTGG TCGGCCCAAT CGGCCCGGTG TCTACACCAA TATCAGCCAC CACTTTGAGT 3480
GGATCCAGAA GCTGATGGCC CAGAGTGGA TGTCCAGCC AGACCCCTCC TGGCCGCTAC 3540
TCTTTTCCC TCTTCTCTGG GCTCTCCAC TCCTGGGGCC GGTCTGAGCC TACCTGAGCC 3600
CATGCAGCCT GGGGCCACTG CCAAGTCAGG CCCTGGTTCT CTTCTGTCTT GTTTGGTAAT 3660
AAACACATTC CAGTTGATGC CTTGCAGGGC ATTCTTCAAA AGCAGTGGCT TCATGGACAG 3720
CTCATTCTCT CTTGTGCAGA CAGCCTGTCT GTGCCCCTGG CTCACACCCA CATCTGTTCT 3780
GCACCATAGA ACCATCTGGT TATTTGATC AGAAAGAGAA TTGTGTGTTG CCCAGGCTGG 3840
TCTTGAACGC CTAGGGTGTC TCGATC 3866

(2) INFORMATION FOR SEQ ID NO:28:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 1165 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:28:

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CTGAACCGGG TTGTGGGCGG CGAGGACAGC ACTGACAGCG AGTGGCCCTG GATCGTGAGC	60
ATCCAGAAGA ATGGGACCCA CCACTGCGCA GGTTCCTCTG TCACCAGCCG CTGGGTGATC	120
ACTGCTGCCC ACTGTTTCAA GGACAACCTG AACAAACCAT ACCTGTTCTC TGTGCTGCTG	180
GGGGCCTGGC AGCTGGGGAA CCCTGGCTCT CGGTCCCAGA AGGTGGGTGT TGCCTGGGTG	240
GAGCCCCACC CTGTGTATTC CTGGAAGGAA GGTGCCTGTG CAGACATTGC CCTGGTGCGT	300
CTCGAGCGCT CCATACAGTT CTCAGAGCGG GTCCTGCCCA TCTGCCTACC TGATGCCTCT	360
ATCCACCTCC CTCCAAACAC CCACTGCTGG ATCTCAGGCT GGGGGAGCAT CCAAGATGGA	420
GTTCCTTTCG CCCACCTCA GACCCTGCAG AAGCTGAAGG TTCCTATCAT CGACTCGGAA	480
GTCTGCAGCC ATCTGTACTG GCGGGGAGCA GGACAGGGAC CCATCACTGA GGACATGCTG	540
TGTGCCGGCT ACTTGGAGGG GGAGCGGGAT GCTTGTCTGG GCGACTCCGG GGGCCCCCTC	600
ATGTGCCAGG TGGACGGCGC CTGGCTGCTG GCCGGCATCA TCAGCTGGGG CGAGGGCTGT	660
GCCGAGCGCA ACAGGCCCGG GGTCTACATC AGCCTCTCTG CGCACCCTC CTGGGTGGAG	720
AAGATCGTGC AAGGGGTGCA GCTCCGCGGG CGCGCTCAGG GGGGTGGGGC CCTCAGGGCA	780
CCGAGCCAGG GCTCTGGGGC CGCCGCGCGC TCCTAGGGCG CAGCGGGACG CGGGGCTCGG	840
ATCTGAAAGG CGGCCAGATC CACATCTGGA TCTGGATCTG CGGCGGCCCTC GGGCGGTTTC	900
CCCCGCCGTA AATAGGCTCA TCTACCTCTA CCTCTGGGGG CCCGGACGGC TGCTGCGGAA	960
AGGAAACCCC CTCCCCGACC CGCCCGACGG CCTCAGGCCC CGCCTCCAAG GCATCAGGCC	1020
CCGCCCAACG GCCTCATGTC CCGCCCCCA CCACTTCCGG CCGCGCCCCG GGGCCAGCG	1080
CTTTGTGTA TATAAATGTT AATGATTTT ATAGGTATTT GTAACCCTGC CCACATATCT	1140
TATTTATTCC TCCAATTTCATAAAA	1165

(2) INFORMATION FOR SEQ ID NO:29:

(1) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 933 base pairs

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(B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:29:

AATGCGGCCA CTCCAAGGAG GCCGGGAGGA TTGTGGGAGG CCAAGACACC CAGGAAGGAC	60
GCTGGCCGTG GCAGGTTGGC CTGTGGTTGA CCTCAGTGGG GCATGTATGT GGGGGCTCCC	120
TCATCCACCC ACGCTGGGTG CTCACAGCCG CCCACTGCTT CCTGAGGTCT GAGGATCCCG	180
GGCTCTACCA TGTAAAGTC GGAGGGCTGA CACCCTCACT TTCAGAGCCC CACTCGGCCT	240
TGGTGGCTGT GAGGAGGCTC CTGGTCCACT CCTCATACCA TGGGACCACC ACCAGCGGGG	300
ACATTGCCCT GATGGAGCTG GACTCCCCCT TGCAGGCCTC CCAGTTCAGC CCCATCTGCC	360
TCCAGGACC CCAGACCCCC CTCGCCATG GGACCGTGTG CTGGGTAAAC GGGCTGGGGG	420
TCCACTCAGG AGAGGCCCTG GCGAGTGTC TTCAGGAGGT GGCTGTGCCC CTCCTGGACT	480
CGAACATGTG TGAGCTGATG TACCACCTAG GAGAGCCCAG CCTGGCTGGC CAGCGCCTCA	540
TCCAGGACGA CATGCTCTGT GCTGGCTCTG TCCAGGGCAA GAAAGACTCC TGCCAGGGTG	600
ACTCCGGGGG GCCGCTGGTC TGCCCCATCA ATGATACGTG GATCCAGGCC GGCATTGTGA	660
GCTGGGGATT CGGCTGTGCC CGGCCTTTC GGCCTGGTGT CTACACCCAG GTGCTAAGCT	720
ACACAGACTG GATTCAGAGA ACCCTGGCTG AATCTCACTC AGGCATGTCT GGGGCCCGCC	780
CAGGTGCCCC AGGATCCCAC TCAGGCACCT CCAGATCCCA CCCAGTGCTG CTGCTTGAGC	840
TGTTGACCGT ATGCTTGCTT GGGTCCCTGT GAACCATGAG CCATGGAGTC CGGGATCCCC	900
TTTCTGGTAG GATTGATGGA ATCTAATAAT AAA	933

(2) INFORMATION FOR SEQ ID NO:30:

(i) SEQUENCE CHARACTERISTICS:

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- (A) LENGTH: 980 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:30:

CCTGTGGTCG CCCCAGGATG CTGAACCGAA TGSTGGGCGG GCAGGACACG CAGGAGGGCG	60
AGTGGCCCTG GCAAGTCAGC ATCCAGCGCA ACGGAAGCCA CTTCTGCGGG GGCAGCCTCA	120
TCGCGGAGCA GTGGGTCTTG ACGGCTGCGC ACTGCTTCCG CAACACCTCT GAGACGTCCC	180
TGTACCAGGT CCTGCTGGGG GCAAGGCAGC TAGTGCAGCC GGGACCACAC GCTATGTATG	240
CCCCGGTGAG GCAGGTGGAG AGCAACCCCC TGTACCAGGG CACGGCCTCC AGCGCTGACG	300
TGGCCCTGGT GGAGCTGGAG GCACCACTGC CCTTCACCAA TTACATCCTC CCCGTGTGCC	360
TGCCTGACCC CTCGGTGATC TTTGAGACGG GCATGAACTG CTGGGTCACT GGCTGGGGCA	420
GCCCCAGTGA GGAAGACCTC CTGCCCCAAC CGCGGATCCT GCAGAACTC GCTGTGCCCA	480
TCATCGACAC ACCCAAGTGC AACCTGCTCT ACAGCAAAGA CACCGAGTTT GGCTACCAAC	540
CCAAAACCAT CAAGAATGAC ATGCTGTGCG CCGGCTTCGA GGAGGGCAAG AAGGATGCCT	600
GCAAGGGCGA CTCGGGCGGC CCCCTGGTGT GCCTCGTGGG TCAGTCGTGG CTGCAGGCGG	660
GGGTGATCAG CTGGGGTGAG GGCTGTGCCC GCCAGAACCG CCCAGGTGTC TACATCCGTG	720
TCACCGCCCA CCACAAGTGG ATCCATCGGA TCATCCCCAA ACTGCAGTTC CAGCCAGCGA	780
GGTTGGGCGG CCAGAAGTGA GACCCCCGGG GCCAGGAGCC CCTTGAGCAG AGCTCTGCAC	840
CCAGCCTGCC CGCCACACC ATCCTGCTGG TCCTCCAGC GCTGCTGTTG CACCTGTGAG	900
CCCCACCAGA CTCATTGTA AATAGCGCTC CTCCTCCCC TCTCAAATAC CCTTATTTTA	960
TTTATGTTTC TCCCAATAAA	980